The Citrus Industry

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JAMES C. MORTON
Prominent Citrus Grower, Promotional Director Florida Citrus Mutual, Polk County Civic Leader

Vol. 29, No. 12 December, 1948

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President's Address . . .

W. F. WARD, President,
FLORIDA STATE HORTICULTURAL SOCIETY

The citrus growers of Florida breathed a sigh of relief on the afternoon of October 5th when the second hurricane to hit Florida in a period of 3 weeks passed out to sea without doing serious damage to the citrus fruit crop and groves of the State. Neither of the 2 hurricanes hit the main citrus growing sections of the State and the loss to the industry as a whole was negligible. The Lower East Coast growers did not fare so well and 75% of the avocado crop on the trees was blown off by the first hurricane of September 21st and 22nd. Most of the remaining crop was blown off during the last storm. The older and taller trees suffered considerable breakage of limbs but the younger trees were not seriously damaged by the winds.

Torrential rains which fell during each storm have given the growers in the Miami and Homestead areas a problem which may cause greater damage than the winds. Persian lime groves suffered considerable damage and loss of most of the remaining fruit crop. About one-half of the avocado crop and two-thirds of the lime crop had been harvested in the Homestead area prior to the first hurricane. The avocado and lime growers in the Ridge Area had small losses.

Vegetable growers suffered heavy losses in the Lower East Coast and Lake Okeechobee sections. The damage to the sugar cane crop is still undetermined. Taken as a whole, weather conditions during the last 12 months have been rather favorable. Some localities had slight damage from the cold on the night of January 16th. Other sections suffered from drought during May and early June but the majority of the state had good rains scattered well throughout the year and less irrigating was done than normal. All of the citrus area of Florida excepting a small area of the West Coast has had more than average rainfall which has been quite beneficial to citrus groves and resulted in the best cover crops grown in recent years.

The 1947-48 marketing season which ended in August was generally unsatisfactory and considerable grapefruit was left on the trees. The outlook for a profitable season in 1948-49 is not very bright. The need of one large marketing agency for the sale of citrus crops becomes more apparent as time goes on and our fruit crops increase in volume. When 80% or more of the growers will come to an agreement to work together is the $64.00 question.

Florida citrus groves are now producing more than 100 million boxes of fruit a year and before many years our production will doubtless reach 150 million boxes. The canning industry is using a larger volume of fruit each year. During the 1947-48 season just closed, about 30 million boxes of fruit from orange trees and 20 million of grapefruit were used in making up canned juices, concentrate, frozen concentrate and sections. While the amount of fruit used in the future for canning will doubtless increase, it will undoubtedly reduce the consumption of fresh fruit so that the successful marketing of our citrus crop will remain our greatest problem for some time to come.

Considerable progress has been made by the State and Federal experiment stations and laboratories in production practices, disease and insect control, treatment of fruit for shipping and water control measures. Additional funds are badly needed by all of the stations for more buildings, equipment and better paid personnel to take up new problems confronting the industry. Some of the more pressing problems are studies of soils and soil moisture as affecting tree growth, quality and quantity of fruit produced, water conservation and control, irrigation practices, improvement in packing house methods and packing of fruit and development of new types or improved forms of agricultural machinery. We must admit that we have been woefully backward in agricultural engineering research work. Decided improvements are necessary in our present machinery and equipment and new types are desirable for better cultural practices, spraying and dusting.

The rapid growth and expansion of the Vegetable Section of our Society has been extremely gratifying. The splendid programs are attracting increasingly large numbers to that section. Their representatives state that market conditions on vegetables generally were good during this past year. The exceptions were celery and lima beans with potatoes and beans not doing too well at times. High

(Continued on page 19)

LYCHEE NEWS

ORCHARDS ARE OPEN TO PUBLIC

Commercial fruit growers, nurserymen and home gardeners are cordially invited to inspect the plantings of Lychee trees at our Laurel orchards, 14 miles south of Sarasota on U. S. 41.

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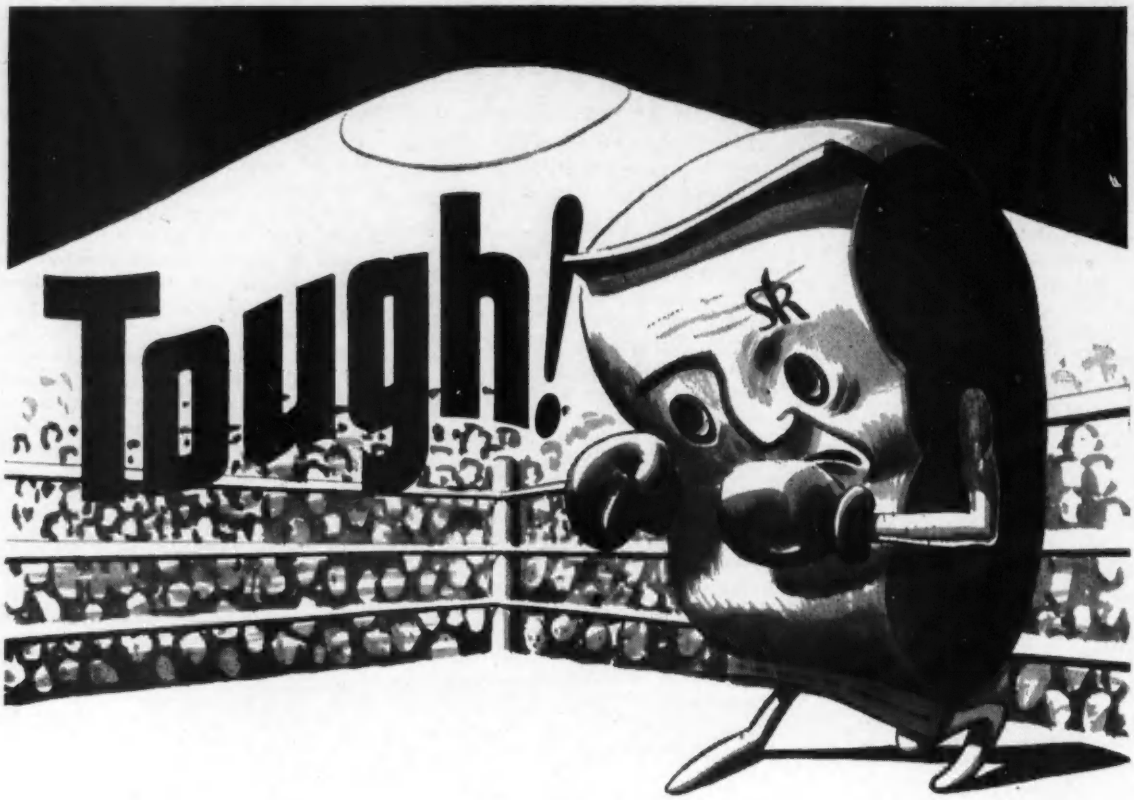

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What Are The Conditions In Citrus? Why?

Can The Industry Be Saved? How?

By MERTON L. COREY
AT TAVARES, FLA., NOV. 15, 1948

The Issue

Florida growers are now voting on this question: Shall the growers control the marketing of their citrus? Those who sign Mutual contracts favor such control. Those who do not become members are voting against grower control, for their fruit is needed for the 75% of total tonnage, without which Mutual cannot be put into operation.

There is little open opposition to Mutual with one notable exception—by a concern that boldly declares its policy of putting many growers and operators out of business.

Most of the opposition is subtle. Suddenly, some shippers and canners who have refused to help the growers organize so they might enjoy the marketing benefits made available only to growers under Federal laws, have come up with many new ideas as to how the industry can be saved. This same group knows that all the ideas now proposed cannot solve the vital problem—the control of the marketing of fresh and canned fruit by a growers' organization.

There is only one issue: Grower Control. There isn't any half-way position which can be honestly taken. And it's the only hope of the citizens of Florida, most of whom can't vote, but who pray that you growers will be brave and wise in the face of clever and deceptive opposition.

With this statement of the issue, let's consider the subjects announced.

Production

1947-48 estimate 100 million boxes. Is that too much? Measured by the realistic standard of marketing at prices which return fair profits to producers, the answer is: Yes.

But if low prices are in part the result of marketing inefficiency, we shall not know how much we can market at satisfactory prices until we do a better job of marketing.

Marketing

15,000 growers are marketing citrus through 400 shippers and 60 canners. The competition of these agencies of the growers is bound to be ruinous.

No wonder the Florida State Bankers Association declared: "If ever there was an industry shot through and through with lack of confidence, suspicion of motives and intentions on the part of all segments, it is the Florida citrus industry."

Growers are in poor position to criticize the practices of these 460 marketers. They turn control of the crop over to this great army of competitors and ask them to battle it out in the markets. So, without any organization, they dump into the same markets, cut prices in desperation, destroy price stability with the trade.

Marketers endowed with the wisdom of Solomon and the virtues of the saints, cannot follow these practices with profit to you or to themselves.

Prices and Losses

Your 1946-47 crop returned nearly 100 million dollars less than the 1945-46 crop. The 1947-48 crop sold for nearly 120 million dollars less.

Despite the warning of the Florida Bankers Association published July 23, 1948 the growers refused to correct this situation through organized control of their own fruit. They now are paying a terrific price for their failure to heed the Bankers' advice: "We recommend, we urge the growers of Florida to consider the contracts and put Mutual into operation at the earliest possible moment."

The Bankers recognized what

is known by every informed person in the industry that growers alone have the power to correct this situation.

For the third successive season, you are paying a terrific price for your failure to control the marketing of your fruit.

The market page of your daily newspaper which gives the sales and prices on the nine auction markets, is a daily argument to get your growers' organization completed.

I read from the last available report in the Saturday, November 13 issue of the Tampa Tribune reporting on the market of Friday, November 12:

42 cars of Florida oranges sold for an average of $2.51 per box, 38 cars of California oranges sold on the same markets for an average of $5.05—just double what was paid for Florida, 6 cars of Florida seedless grapefruit sold for an average of $2.37. According to the figures of the State Department of Markets, it cost an average of 53 cents to produce the oranges and 36 cents to produce the grapefruit. Friday's sales returned to the grower at least 35 cents less than cost of production on his oranges, and at least 20 cents less than cost of production on his grapefruit. And for the fruit you are delivering to the canner, you are getting only 20 to 25 cents to apply on production costs after picking and hauling charges. Nothing to apply on interest, taxes and depreciation or to deposit in the banks or spend with Florida merchants.

No wonder the bankers and businessmen of Florida are praying that you will be wise in dealing with this problem.

California on the same day averages $5.05 for its 38 cars of oranges. Are they superior to the now high quality of Florida fruit? The answer is orderly marketing through control by growers there, disorganized marketing by your agents here who can't control prices and volume because they haven't the legal right to do so. Only the growers have the power to correct this situation.

Just how much punishment do you propose to take before you exercise your rights and assert your power?

State depends on Growers

The Florida Bankers made the study and published the report because they believe that the crisis is so great they must speak in the public interest despite the opposition of some of their big-though selfish—customers.

Whatever happens to Mutual, the Florida Bankers have earned the everlasting respect and gratitude of the citizens of this state for all are being harmed by the failure of the growers to control the marketing. They who know what the real problem is said in their report: "We confidently believe Mutual will solve the industry's marketing problem." But the business, professional and labor interests are helpless. They hope growers will act before it is too late.

They are like the anxious husband in the maternity ward. He helped to create the crisis but he can't deliver the child. Growers, if there is to be a healthy baby, it's up to you to deliver.

Thus briefly for conditions and the "Why" of them. Two years' disastrous prices, a third year promising as bad or worse, because growers have surrendered control of their fruit and those who are handling it for them are powerless to organize the marketing.

Growers Free Agents

Many years back, growers were not free agents. Shippers made loans to them on marketing contracts. How different now! Growers have access to state and national bankers and to government credit agencies, all of whom endorse Mutual—yes, not only endorse it but declare that loan values will be reduced unless Mutual is organized.

Nobody opposing Mutual has any financial control over most of the growers.

In the absence of such power, they are attempting to kill Mutual by seeking to create doubt and confusion, whispering criticisms of leaders, and proposing remedies in the far advanced future which cannot cure conditions and which the same group will oppose if it ever appears that grower control can be effected through some other means. Selfish operators have the right to entertain their present business views. If you don't agree with them, there is only one way you can effectively oppose them—by signing a Mutual contract.

What About Now? 1948

Mutual offers the only hope for the present season. Are you growers going to listen to siren songs about the dim, distant future with crashing prices crushing you daily?

You have the right to refuse to play your part. It's your fruit. But your neighbor growers and the State of Florida hope that you will not longer be deceived. You must choose between Mutual on the one hand and the group and practices which made the bad record for two years and is now starting an equally bad third year.

If all the dreamed-up criticisms of Mutual prove true, it simply couldn't make things quite as bad as the record its opponents have made.

You can't hurt yourself falling out of bed when you're already sleeping on the floor.

If they are true, then the U. S. Government, California and thousands of other farm groups in the nation have been mistaken for the past 26 years since the Capper-Volstead Act was passed.

Can the industry be saved? How?

YES, it can be. How? By an organization of growers with control of marketing.

The Florida Citrus Mutual

It is organized in compliance with the Capper-Volstead Law enacted by Congress which alone has power to legislate as to interstate commerce. I quote therefrom:

"Persons engaged in the production of agricultural products—may act together in collectively processing, preparing for market, handling in interstate and foreign commerce, such products of persons so engaged—provided that such associations are operated for the mutual benefit of the members thereof."

Through agencies of their own choosing, growers can empower them to control quality and distribution. The Capper-Volstead Act provides: "Such associations may have marketing agencies in common—and may make the necesary contracts and agreements to effect such purposes." That's what California is doing—that's what Florida must do.

Florida is a pat example of the need to protect growers from their own destructive competition, whether directly or through their agents.

Shippers and canners cannot plan market and price controls except through a growers' organization.

The Florida Citrus Mutual grower-member will elect a Board of 21 Directors and approve an operating committee of shippers and canners.

Mutual will have power to establish the necessary market controls. And it has other powers which growers can exercise for the benefit of the industry. The hour is late. Some of these powers may never be exercised. It is too late for others this season. We can, we must make the power to organize

the markets effective this season.

Only the Grower-Board has authority to determine plans and policies. But, in view of the crisis, we believe that when it is apparent we shall have the 75% sign-up, we should at once call in able men from the industry and from banking and business circles to draft plans for marketing the remainder of the crop. With their help, we feel confident that a growers' Board will promptly approve the plans, and we shall save several precious weeks while the elections are being held.

If growers act promptly by joining Mutual, we can probably put it into operation while 50% of the fresh fruit and 65% per cent of the canned, remains to be marketed.

The member-growers' contract requires him to market through a handler who has signed a handler's contract. Every shipper and canner is in duty bound to growers to cooperate in giving the industry the benefit of the Capper-Volstead Act. Our thanks to the many handlers who have signed contracts. The state appreciates their public spirit and they shall share in the rewards of organized marketing.

We have waited too long for some of them to act voluntarily. It is now time for you growers to speak. This may be your last chance to get back the control of your fruit. Don't worry about the shippers and canners. They'll come along when they must look to your own organizations for the fruit they want to ship or can.

Industry Factors

To date, we haven't said much about some of the factors in the industry who not only have not helped the growers to organize but, have with a great deal of cleverness, attempted to weaken the campaign by whispered criticisms of its temporary personnel and by diverting attention from the real problem of organized marketing of quality fresh fruit and in cans by proposing plans which they know full well cannot solve the major problems this season nor in the future. "Red Herrings" are crawling up from the Florida beaches.

Now the day of decision has come. Every day of indecision means diminished grower control. In this crisis, in the words of Woodrow Wilson in his war message to Congress in April of 1918, "We must all **speak, act** and **serve** together."

Consider the independent shippers and canners. Many grower-shippers and grower-canners who share with ordinary growers the interest in better marketing and fair price returns for the fruit juice have joined Mutual.

You growers are going to decide whether the business practices and philosophy of one of these large operators are to dominate the citrus business. It has the right to pursue the "dog-eat-dog" attitude, which enlightened business is abandoning. It has the right to persist in its declared policy of putting growers and handlers out of business that control may be in their hands and a few other like-minded operators whose profit motives blind them to the public interest.

But the state of Florida, businessmen, bankers, as well as growers, hope and believe you will not let them get away with it.

Are we mice or men?

The Concentrate Business

Consider the concentrate business as another example of the price you pay for losing control of your fruit. Here is a product commanding immediate consumer acceptance. The supply cannot meet the demand. Capital is flowing into concentrate plants. A recent newspaper story told of the immense profits a famous movie and radio star made out of speculating in concentrate stock. His profits will be more than the total 1948-49 profits of all Florida growers on all the production, fresh, canned and concentrate.

It was generally predicted that the concentrate plants would pay $1.50 for oranges. They are paying as low as 75 cents for 10½ solids.

The concentrate business is following the old disastrous pattern. Again, there is no hope for the growers unless they either control the plants or have a central bargaining agency to represent them in the fixing of minimum prices. Mutual can and will do just that.

Other Plans

Various partial remedies have been proposed. Mutual's charter permits them to put all of such plans into effect which are practically and legally sound—better quality standards, minimum prices, etc. Mutual controls of canned fruit should be supplemented by federal or state marketing agreements so that quality standards may be imposed on all.

Quality, only, not the answer

It is being demonstrated that the exercise of power by the growers to control marketing and fix prices is the very heart of the problem. Quality fruit is now being marketed—with nine solids and better and still the prices are way below the cost of production.

The crops of 1946-47 and 1947-48 which sold at over 200 million dollars less than in the 1945-46 crops were of unusually poor quality. Now with good quality, results promise to be the same. There is only one answer and it's up to the grower to give it.

Mutual—the voice of the Florida Growers

New problems will arise. Mutual, representing growers large and small, patronizing all types of handlers, independents as well as cooperatives, will have powerful influence in Congress, in the State Legislature, and before the various administrative and regulatory agencies.

We Americans are a patient, trusting people, living in hope, postponing the exercise of our powers and talents. So we drifted into two world wars and civilization hung in the balance. Then an aroused America, cooperatively, did the most magnificent job in production and fighting history has ever known.

There are great qualities in Americans. Great difficulties call out these great qualities. Woe be to the man or organization who believes that the growers of Florida are going to tamely submit to these conditions. They will reclaim the fruit they produce and own and assert the powers the government gave them to make their business pay.

I have faith in the growers of Florida, in the shippers and canners who do have regard for the public interest, in its bankers and businessmen who are ready to fight to rescue the business from the designs of selfish men.

The hour has struck. It's now or never for many, perhaps most, of you growers.

Let's together meet this challenge like men.

TWENTY 4-H CLUBS ARE ORGANIZED IN MANATEE

Twenty 4-H clubs for boys have been organized in Manatee County under the direction of County Agents Ed. L. Ayers and Joe N. Busby. This is five more than the number of clubs in the county last year.

A farm inventory will show whether or not you are getting ahead financially, and how much.

Canning and By-Products Research At Citrus Experiment Station

By F. W. WENZEL
LAKE ALFRED, FLORIDA,
AT MEETING FLORIDA STATE
HORTICULTURAL SOCIETY

Introduction

Excellent facilities for research in canning and by-products have been provided at the Citrus Experiment Station through the cooperation of growers, processors, state and federal agencies, and many other persons, who are today interested in the welfare of the Florida citrus industry. The eleven research personnel now working in the canning and by-products department at the Station includes three food technologists, three chemical engineers, four chemists, and one bacteriologist. All of the research being carried on at the present time is a result of the cooperation of personnel of both the Station and the Florida Citrus Commission. All of the personnel are desirous of doing research, which will benefit the citrus industry as a whole, and not just any one particular group. We want to be helpful to both growers and canners, as well as to independent and cooperative organizations. Results secured from our research program can only point the way toward improvement in the citrus industry, and what the future of the industry will ultimately be depends on the desires and motives of all growers and processors.

One realizes how important research in canning and by-products may be to the citrus industry when one considers how much of the citrus crop is going to the processing industries. Sixty-six percent (19,128,389 boxes) of the grapefruit harvested, 52 percent (30,-104,341 boxes) of the oranges, and 20 percent (598,505 boxes) of the tangerines were processed during the 1947-48 season. Thus 55 percent of the total citrus crop harvested during the last season, or 50 million boxes out of 90 million boxes, went into canned, concentrated, or other processed products. This represents an increase of 11 percent over the amount which was procesed in 1946-47.

A research program will be of help to the citrus processor if it produces results which will show how the quality of processed citrus products may be improved. Research should also lead to the development of new products from citrus in both the processing and by-products fields. If high quality citrus products can be produced and offered to the consumer at reasonable prices, demand will increase and overproduction will cease to be a problem. The increasing popularity of frozen concentrated orange juice, since its beginning in 1946, illustrates how a new high-quality product can rapidly become an important factor in the industry. The research program at the Station is aimed at improving the quality of all types of processed citrus products.

Canning Research

During the past year the installation of the equipment and machinery for the new canning plant was completed. Citrus juices have been satisfactorily processed at the Station since December 10, 1947, when the first pack of orange juice was canned. Using fruit from the Station groves and other groves in the state, 49 packs of orange, grapefruit, tangerine, and blended juices were processed. These packs yielded approximately 1100 cases of juice, each case containing 24-9½ ounce cans. Approximately 2000 gallons of juice were processed.

During the past season juice was canned from fresh fruit produced on the Station blocks, which has been maintained under different fertilizer treatments. Eleven packs were processed. These packs yielded blocks which had been treated with fertilizers containing varying amounts of potash, magnesium, and manganese. The quality of the canned product depends on the quality of the fresh fruit used, since very few products are improved by canning. Any factor, such as variety, rootstock, soil, rainfall, and fertilizer, which affects fresh fruit quality will be important in determining the quality of the canned product. Only fruit of high internal quality should be canned or concentrated. Fruit of poor internal quality should be diverted to other uses. By research on the effect of fertilizer practices on the canning quality of citrus juices our ultimate aim is to find out the type of fruit best suited for canning and how to produce it.

Spray treatments also affect fruit quality, and therefore, during the past season we put up some packs of juice from fruit which had been sprayed with different types of materials. It is essential that new spray materials be tested prior to their general use in order to be sure that they will not be detrimental to the quality of the canned product. Organic spray materials may have an odor or taste which might penetrate into the juice of the fruit. A foreign musty odor and taste was detected in canned orange juice which was secured from fruit that had been sprayed with benzene hexachloride.

The utilization of grapefruit in canned orange-grapefruit blends serves as a good outlet for this fruit. Work is being done on the standardization of blends. We are attempting to determine what acidity, sweetness, proportion of the two juices, and other characteristics are necessary to give a blend of high quality and good consumer acceptance.

A plant for the concentration of citrus juices has been installed at the Station and was first used for the concentration of orange juice on May 7, 1948. Utilization of this plant for research on frozen concentrated orange juice is planned. Further work on the standardization of low solids orange juice by partial concentration is also contemplated, as has been pointed out by Mr. Atkins and Dr. Moore today in their discussion of this subject.

By-Products Research

In the field of citrus by-products Mr. Kesterson and Mr. McDuff have today reported on the work which they have completed on the production and properties of Floridian oil of orange during the 1947-48 season, and Dr. McNary has presented a progress report on the production of methane from the waste water of canning plants. In-

vestigation of the cause of the unpredictable instability of citrus molasses has been undertaken. Stabilization of citrus molasses is desirable, since excessive frothing presents difficult storage problems. The physical and chemical properties of 25 samples of molasses, which were secured from 13 processing plants, have been determined. Large variations were found in most of the characteristics of the samples. Here again we have a citrus product which needs standardization in order that a product of uniform quality might be offered for sale. The color varies from light tan to dark brown, total sugar content from 33 to 50 percent, pH from 3.9 to 6.2, and there were very large differences in relative viscosity. The question of instability has yet to be solved.

Flavor Research

The quality of fresh, concentrated, or canned citrus juices depends upon many factors. As pointed out by Plank (1) a rational method for grading the quality of any food product should be based on subjective (organoleptic), objective, biological, and external characterictics. Subjective (organoleptic) values are by far the most important in consumer evaluation of the quality of a food product. Taste and aroma are examples of subjective qualities, which so far have defied analytical measurement and therefore have to be judged on physiological sensations and psychological reactions. Objective properities such as color, Brix, and acidity can be determined by various methods of measurement. Under biological values may be included microbioligical (bacteria, yeasts, molds,) content, nutritive value, and enzyme activity. The presence of undesirable substances such as seed particles, and the type of packaging may be classed as external characteristics. Any method for grading the quality of citrus juices should take into consideration these four categories of quality values.

Flavor has and always will be a predominant factor in determining the quality of any food product, and this is even more pronounced in the case of citrus juices. Flavorsome products definitely outsell those which have poor flavor qualities. Because of the vast importance of flavor as a factor in citrus juice quality, we are developing a taste panel hoping that it will be of assistance in the determination of the quality of experimental and industrial packs of citrus juices, that it may help to determine consumer preference, and that it may yield data which may assist in the determination of future standards of quality for citrus juices. We desire to present today a brief discussion of the preliminary work which has been done up to the present time in order that we might secure constructive criticism and suggestions from this group.

The flavor preference score sheet (Table 1) is the first of a series of score sheets which we hope to develop to cover all subjective, objective, biological, and external properties which contribute to the quality of citrus juices. After the complete series of score sheets has been developed, we hope to have as accurate a method as possible for the determination of the quality of fresh, concentrated, or canned citrus juices. We do not intend the score sheet (Table 1) to be used by large consumer groups but only by small groups where direction and supervision can be given. Intelligent understanding and use of this score sheet is necessary if consistent and reliable scores are to be obtained. The seven characteristics of citrus juice which are considered to attribute to its flavor are: aroma, ratio, body, bitter extractives, peel oil, flavor intensity, and off flavor. Directions for grading the juice using the preference score sheet (Table 1) are presented in Table 2. This direction sheet should be given and explained to all tasters, who should also have an opportunity to taste samples of juice which contain bitter extractives, peel oil, and various types of off flavors in order that they may score the juice intelligently.

TABLE 1. DETERMINATION OF CITRUS JUICE QUALITY
Flavor Preference Score Sheet

Aroma	———	Excellent	10
		Very Good	9
Ratio	———	Good	8
		Fair	7
Body	———	Borderline Plus	6
		Borderline	5
Bitter Extractives	———	Borderline Minus	4
		Poor	3
Peel Oil	———	Very Poor	2
		Objectionable	1
Flavor Intensity	———		

Table 2. Directions for Using Flavor Preference Score Sheet

		OFF FLAVOR
None	10	None
Questionable	9	Cooked
Slight	8	Musty
Definite—Not Disagreeable	7	Soured
Borderline Plus	6	Stale
Borderline	5	Tinny
Borderline Minus	4	Fruity
Disagreeable	3	Overripe
Very Disagreeable	2	Immature
Repulsive	1	Perfumey
		Putrid
		Pea-like
		Tomato-like
		Astringent
		Rancid
		Other

OVERALL ACCEPTANCE———

NAME———

Citrus Juices

1. Aroma is detected by smelling the juice before tasting it.

2. Ratio refers to the relationship of balance between the sweetness and acidity of the juice.

3. Body of a juice is chiefly dependent upon the soluble solids present in the product and is judged by the feel of the juice in the mouth.

4. Bitter extractions refer to bitter constituents extracted from the peel, rag, or seeds of the fruit, but this factor does not include the peel oil.

5. Peel oil is the essential oil which is extracted from the peel.

6. Flavor intensity refers to the strength of desirable flavors. An insipid or week flavor would be considered here. Do not include in-

(Continued on page 11)

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OVER-ALL AUTHORITY NEEDED

A contributor to "Grower's Own Page" in this issue asks why this publication is not giving greater publicity and support to the county organizations of growers now being formed in some of the citrus growing counties of the state. The answer is easy.

As a purely grower publication, The Citrus Industry gives hearty approval to any organization which has as its object the welfare of the growers, whether such organization be of county, statewide or national scope. Right now we are vitally concerned with the successful organization and operation of a statewide body with over-all authority to control the marketing operations of every citrus growing county in the state — the Florida Citrus Mutual.

County organizations of citrus growers hold a prominent place in the citrus picture, but their field is too limited — they take in too little territory. They serve a purpose, and an important purpose, just as Chambers of Commerce and service clubs in cities and towns serve an important purpose, but to be really effective they need over-all supervision, just as local Chambers of Commerce and service clubs need district, state and national supervision to attain the highest degree of efficiency.

As it appears to us, these county units could achieve the greatest efficiency and best serve their own and the over-all interests of the industry as a whole by joining forces with the one statewide organization now in the making. With all these county units hooked up in one great statewide body effective control of distribution, quality and on-tree returns to the grower would be greatly enhanced. With numerous county organizations, each having its separate and sometimes conflicting interests and with no affiliation with a statewide body, we would have the same confusion which now afflicts the industry through the conflicts of numerous groups. Affiliation with and membership in a statewide body with over-all authority would promote harmony through unity of purpose.

Every grower knows to his sorrow that something needs to be done to rectify present deplorable conditions in the industry. The solution of grower problems and the betterment of grower conditions rests with the growers themselves — no one outside the industry can solve the industry's problems — but the first thing needed is unity of purpose and unity of action. Conflicting views and conflicting interests of various groups are responsible for many, if not most, of the grower's ills. If those ills are to be cured we must forget, or at least subordinate, our jealousies and our conflicting interests and work in unison for the welfare of the industry as a whole through one strong organization of statewide scope controlled by growers from every citrus producing area of the state.

Neither Senator Pepper, Governor-to-Be Fuller Warren, the National Congress nor the State Legislature can provide the cure which rests with the growers themselves — and the growers can do it only by united action through statewide organization. It is the grower's baby — the growers must nourish it.

So, while we heartily approve of county organizations of growers, we are firmly convinced that to secure effective results those county units should join up with Florida Citrus Mutual, and thus aid in bringing about better conditions for themselves, their neighbors and the growers of every citrus producing county in Florida.

TEXAS, TOO, HAS ITS TROUBLES

The Texas citrus growers are having much the same trouble as Florida growers; and that they are looking to Florida to see what is being done to remedy the situation, is shown by the following editorial in Texas Farming and Citriculture:

"Many Texas citrus growers have a deep interest in what their fellow growers in Florida are doing to obtain a fair profit from their fruit. Many other Texas growers seem to lack such interest. Yet the citrus marketing problems here and in Florida are fundamentally much the same. How can a great increase in grapefruit and orange production within the last two or three seasons be put into unprepared markets without breaking the price structure to a point where superior grapefruit can be sold only at a loss to its growers?

"In endeavoring to solve this problem several measures have been recommended by many of the ablest men in the Texas and Florida citrus industries. A large majority of Florida growers are striving strenuously to adopt the measures, at least in part. No effective action in this direction by a majority of Texas citrus growers is discernible."

THANKS

If there is anyone in Florida, or elsewhere, who does not believe that Florida oranges at their best are the best oranges in the world, he should have joined us in consuming some of the "Dream Navels" presented us in two overflowing baskets by Donald J. Nicholson, citrus grower and nurseryman of Orlando.

The "Dream Navel" is an early maturing orange of finest texture and excellent flavor, bursting with delicious juice, developed by Mr. Nicholson over a period of nineteen years and at a cost estimated by its developer at $65,000.

Without disparagement of any other variety, of which Florida has some of the finest, along with some of much less merit, it may be said with truth that no consumer of this Nicholson product can find just cause for complaint as to the eating quality of this delicious Florida fruit. Indeed it deserves to rank among the top notch varieties of the citrus family.

CANNING AND BY-PRODUCTS RESEARCH AT CITRUS EXPERIMENT STATION

(Continued from page 9)

tensity of off flavors in this category, but score them on other portion of score sheet.

7. Off flavors are **undesirable** or foreign flavors which may be caused by such factors as bacterial action, use of poor quality fruit, methods of processing, enzymatic action, storage and others.

General Directions

1. The product is to be graded on the basis of the taster's **personal preference.** The score given should indicate only the tasters **personal preference** for any factor, and does not necessarily indicate the quality of any constituent present. For example, if a taster recognizes a high peel oil content and does not like it, then he will give a corresponding low score to that constituent.

2. Compare a given type (fresh, canned, or concentrated) of juice with what you consider to be an excellent quality product for that particular type. For example, score canned juice on the basis of what you consider an excellent canned product, but do not score or compare a canned juice with either fresh juice or frozen concentrated juice. Likewise fresh juice should be scored on a fresh juice basis and frozen concentrated juice scored as frozen concentrated juice.

3. Score each factor using the same scale of 1 to 10. Thus a score of 8 would indicate a "good" aroma, a "good" body, or a "good" flavor intensity.

4. Check and indicate with number (1 to 10) the degree of **individual** off flavors which are present in the juice, and encircle the proper number to indicate the degree of **all** off flavors.

5. The **overall acceptance** score indicates the composite reaction of the taster to **all** the flavor factors including both desirable and off flavors. Other factors, such as seed and other foreign particles, or color should not be taken into consideration. A score of 5 or above for the overall acceptance indicates that **you** would **buy** the product for home consumption.

6. Do not make comments about your opinion of the juice while other tasters are scoring the product, since such comments may influence their judgment.

The juice to be scored is placed in a one-gallon thermos jug, which has an attached faucet, and this container is then placed in a desirable and convenient location. By the use of the thermos container a juice temperature of 40 to 50° F. is maintained. Three-ounce untreated paper cups are used. Two samples of juice are scored each day, one sample being put out at 10:00 a. m. and the other samples at 3:00 p. m. The persons on the taste panel sample and score the juice at their convenience during a

(Continued on page 22)

Our
sincere
wish to all
of you for a
Merry Christmas
. . . and for a
Happy and
Peaceful
New Year

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Avon Park
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Pictured above are G. I. Gilliam (lef
12-year-old grove which has been under
Gilliam. Fruit from this grove was one
the section and the fruit brought top p

The average yield from this grove
grove was fertilized with Lyons Fertili
is one of the show groves of Orange C
one of the larger caretaking organizati
and have been agents for the Lyons Fe
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iam (lef B. Goding (right), in a
en under inuous care of Goding &
vas one of liest crops to move from
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s grove 5 boxes per tree. The
Fertiliz h organic mixtures and
range C oding & Gilliam direct
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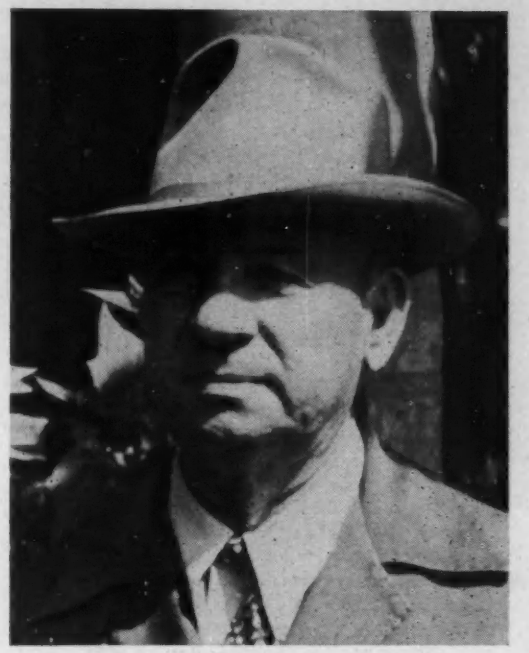
Tampa
General Manager



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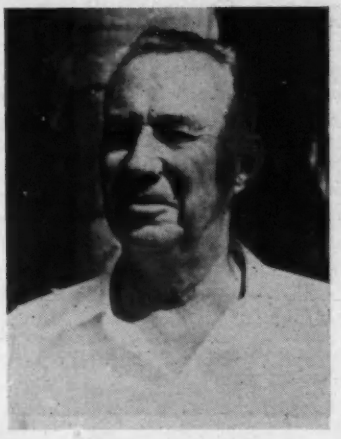
V. E. (Val) Bourland, Salesman
Orlando
North Central Florida territory



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Insurance Against A Foreign Invader...

T. RALPH ROBINSON

AT MEETING OF FLORIDA STATE HORTICULTURAL SOCIETY

There are enemies other than human that at times have threatened our happiness and our ecenomy if not our actual lives. We have been hearing for several years past of the dread inroads of a new virus disease of citrus that has killed millions of bearing orange trees in South America. In Brazil it is called, "Tristeza"—the sad disease. Sad it must be. In California "Quick decline" appears to be something very similar if not identical. In each case it kills only trees budded on the sour orange root stock. Oranges, grapefruit, and tangerines so budded die in three to five years, — lemons, whether scions or rootstocks are immune.

In South America it has been demonstrated that the virus is spread by a single species of aphis, the "black aphis," which is not known to exist in this country. However recent conversations with travelers who have come by air from South America readily dissipate any false feeling of security. Our plant inspection service is doing a fine job in keeping out harmful insects and diseased plants but the task is becoming almost beyond human capacity, with the enormous increase in travel. A bouquet of flowers with a few aphids hidden away, or a stick of bootlegged budwood supposedly disease free might bring the dread disease to our shores. Mention of the budwood brings to mind that a twig from an orange tree budded on an immune stock and to all appearances entirely free of the disease may yet be a **carrier** of the virus and capable of transmitting it to another orange tree budded on the sour orange rootstock. There may prove to be insects other than the black aphis capable of transmitting the virus as is apparently the case in California.

It is true that Florida is in the best strategic position of any large producing citrus area in the world, since the great bulk of the Florida crop (about three-quarters) comes from trees budded on stocks that make the plant immune to the virus disease,—budded chiefly on the rough lemon root stock. Yet it is also true that a great deal of our very finest fruit is derived from the so called hammock groves, where the sour orange has been the favored root stock since the earliest days of citrus planting in Florida. The owners of these fine groves could ill afford to see them gradually wiped out. Their replacement would be an extremely expensive affair, and a great disaster to the state and to the nation.

Experiments have shown that if a tree exposed to the virus infection is inarched to an immune stock, such as the rough lemon, Cleopatra mandarin, sweet orange or citrange it may be saved from destruction,—provided this is done before the disease gets a firm foothold.

Now the reason for this paper is to describe a method of inarching that may be successfully applied to old bearing trees. The writer saw this method being used in a famous old grove near Lake Thonotosassa in Hillsborough County—the Belvedere Grove. The grove is owned by Mrs. S. R. Stebbins. This was in March of 1934. The trees about sixty years old had grown so large that they shaded the ground almost completely and footrot was beginning to take some of the veteran trees. Mrs. Stebbins found that the text book method of inarching,—planting small seedlings near the base of the tree and approach grafting them into the trunk—simply did not work. The small shaded seedlings just could not make headway under the circumstances.

She then decided to try something different. She had her seedlings,—in this case rough lemon,—grown up to eight or ten feet tall, full of vigor and easily transplanted. She had two or three of these seedlings planted around each of the affected orange trees **at a distance of two to three feet from the base of the tree.** The approach graft was made often at a height of four to six feet from the ground, so high that in some cases a person could walk around the trunk of the tree between the trunk and the inarched seedlings. In most cases a prompt union was secured. These whip-like stems within a years time were two to three inches in thickness and within another year or two were quite capable of bearing the entire burden of supporting the thirty foot tree a foot or more in diameter. In fact in several instances observed the original root system of the old orange seedling was entirely rotted away. Such trees continued to bear fine crops of oranges sustained only by the substitute root system.

Now we may be fortunate enough never to have to resort to such a method of salvaging groves budded on the sour orange root stock. Would it not however be wise to take out an inexpensive insurance policy? By that is meant the planting and maintaining in numerous neighborhood nurseries seedlings of immune rootstocks. As to the choice of rootstock much will depend on the soil and on the variety of fruit being grown. The rough lemon is the stock par excellence for most of the varieties grown in Florida. While commonly regarded as mainly suited to deep sandy soils, such as those found in the sand hills of the Ridge section, it is a very adaptable stock. It can be used successfully in low hammock soils if the methods of culture followed are adapted to the location. As a compromise between the rough lemon and the sour orange rootstocks the Cleopatra mandarin has come in much favor of late. It seems best adapted however to a medium grade of well drained soil and is commonly regarded as unsuited to low moist locations, especially where there is at times a high water table. This is the condition that is often encountered in the coastal hammocks of Florida. It is especially adapted for use with the "fancy" varieties such as the Temple and the tange-

los which do not as a rule produce high quality fruit for a number of years when budded on the rough lemon rootstock. However if inarching is done using the rough lemon after the initial years of rapid growth have passed, say six to seven years, there is no reason to fear that the rough lemon rootstock will prove seriously detrimental to the character of the fruit produced. There remains the sweet orange and the citrange as possible choices. The citrange has its advantages in cold locations but the supply of seed is limited. The sweet orange is probably more subject to footrot than any of the above stocks but with proper precautions that should not prove a serious handicap. None of these stocks are likely to prove as easily inarched or approach grafted as the rough lemon, which insures a union being promptly secured in a large majority of cases.

In the case cited—that of the Belvedere Grove,—the actual work under Mrs. Stebbins direction was done by an intelligent negro, an experienced "grove hand" not by a high priced tree surgeon. There is no reason why such a job could not be done by a grove owner or any of his helpers who have had a little experience in propagation.

But it took a person of imagination and initiative like Mrs. Stebbins to forsake the text book methods and devise a method that would work on old trees that had reached a size where they shaded out the ground almost completely. By planting the seedlings at some distance from the tree trunk a space could be chosen away from the main crown roots thus avoiding the sort of fatal competition that killed off the small seedlings planted close to the base of the trunk. To do this the seedlings used had to be tall and vigorous. Thus we may owe to Mrs. Stebbins a great debt of gratitude to have shown us the way, if ever we are forced to work over our old sour stock groves by the inarching method. Even if we escape the Tristeza menace the method has its application in many old groves suffering from footrot or senescence. A recent inspection of this famous old grove shows these inarched trees in a fairly thrifty condition carrying heavy crops of oranges.

The value and appreciation of the effort that has been made by Drs. Swingle, Webber, Camp, and

(Continued on page 21)

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A Method of Maintaining Viability Of Citrus Seed In Storage

By J. F. L. CHILDS
AT MEETING FLORIDA STATE HORTICULTURAL SOCIETY

The storage of citrus seeds for extended periods, as is frequently necessary in shipment over long distances or when planting time is delayed for one reason or another, is usually attended by a serious reduction in viability. Considering the importance of the problem, there is surprisingly little information available in the literature on storing citrus seed in viable condition for prolonged periods. With the exception of L. V. Barton's** work, information is largely confined to rule of thumb recommendations such as to store the seeds in charcoal or in damp sand, or to store the fruits under refrigeration and extract the seeds when needed. Although such methods may be satisfactory for storing citrus seed for several weeks, germinability deteriorates seriousiv with storage for six months or more. In view of the scarcity of information on the subject and the success attained in some storage trials at Orlando, Florida, it was decided to publish the data available.

Preliminary experiments indicated that when citrus seeds were allowed to dry out viability was impaired. On the other hand, if storage was attempted with seeds in a moist condition the growth of fungi and bacteria soon destroyed viability. In order to find a suitable disinfectant for citrus seed to overcome this difficulty, ten fungicides were selected for trial from materials at hand, as follows:

Fermate (ferric dimethyl dithiocarbamate), HE-175 (disodium thylene bisdithiocarbamate), Phygon (dichloro napthoquinone), Semesan (hydroxymercurichlorophenol), DuPont 1155HH (DuPont Semesan Co. code number), 8-hydroxyquinoline sulfate, Puratized N5E (phenylercuritriethanol ammonium lactate), ethanol, thiourea, and thiocyano aniline.

Tests with Seed Disinfectants. The first five materials listed above were applied in dust form to freshly extracted Duncan grapefruit seeds that had been washed to remove juice and mucilaginous materials and then dried on paper towels. The seeds, with an excess of the fungicidal dust, were shaken together in a beaker. Afterwards the seeds were picked up with tweezers, shaken gently to remove excess dust, and transferred to

Table 1. A comparison of fungicides as surface-disinfecting agents for citrus seed.

Material	Nature of surface contaminant: Bacteria	Fungi
1. Fermate, dust	0	+
2. HE-175, dust	+	0
3. Phygon, dust	+	0
4. Semesan, dust	0	0
5. DuPont 1155HH, dust	0	0
6. 8-hydroxyquinoline sulfate 1.0%, dip	0	0
7. Puratized N5E .05% (by volume), dip	0	0
8. Ethanol 70%, dip	+	0
9. Thiourea 5%, dip	+	0
10. Thiocyano aniline 1.0%, dip	0	0
11. Check	+	+
12. Check	+	+

Table 2. Effect of surface disinfection on germination of citrus seed

Material	Germination in percent
1. Semesan	20
2. DuPont 1155HH	0
3. 8-hydroxyquinoline sulfate 1.0%, dip	100
4. Puratized N5E .05% (by volume), dip	100
5. Thiocyano aniline 1.0%, dip	100
6. Check	100
7. Check	100

Table 3. Relative germination of Duncan grapefruit seeds stored one month in cellophane bags at 70°F. The seeds were brought to four levels of moisture content before treatment with disinfectant and storage.

Seed treatment	Germination percentage: Air-dried for 3 days	24 hours	4 hours	Soaked 4 hrs.
Semesan	92	82	78	0
8-Hydroxyquinoline sulfate	100	94	100	98
Check — untreated	78	90	96	90

Table 4. Germination of Fermate-treated and untreated Duncan grapefruit seeds stored 1 to 8 weeks at room temperature at nine levels of humidity, fifty seeds per treatment

Rel. hum. in percent	Germination percentage: 2 weeks Treat.	2 weeks Untreat.	4 weeks Treat.	4 weeks Untreat.	8 weeks Treat.	8 weeks Untreat.
9	83	68	36	20	37	29
32	100	96	40	28	44	21
52	100	100	92	88	52	28
76	100	100	88	84	56	60
88	100	100	100	100	100	100
98	100	100	100	87	80	60
99.4	100	100	100	76	36	22
99.7	100	100	100	100	77	56
100	100	100	94	100	100	68

**Authors: James F. L. Childs, pathologist, and Gustave Hrnciar, scientific aid, Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture.

**Barton, L. V. The storage of citrus seeds. Contr. Boyce Thompson Inst. 13(2): 47-55, 1943.

petri dishes containing potato dextrose agar. The last five fungicides were applied by momentarily dipping the seeds into a solution or suspension of the material. The seeds were drained dry on paper towels before being transferred to agar plates. In three weeks' time no fungus or bacterial growth appeared on the seeds treated with Semesan, DuPont 1155HH, 8-hydroxquinoline sulfate, Puratized N5E, or thiocyano aniline (table 1).

Effect of Disinfectants on Viability. In use, many seed disinfectants are quite specific in toxic effect. Some are safe for the treatment of the seed of certain species of plants and are injurious to the seeds of other species. In order to investigate their possible toxic action and injury to germination, the five most efficient disinfectants in the above trial were used in the following experiment: Lots of 20 freshly extracted Sampson tangelo seeds, washed and surface-dried as before, were treated with (a) Semesan dust, (b) DuPont 1155HH dust, (c) 1.0% solution of 8-hydroxyquinoline sulfate, (d) .05% (by volume) solution of Puratized N5E, and (e) 1.0% solution of thiocyano aniline. After treatment the seeds were germinated in damp cypress wood sawdust at 80°F. Three of the materials, c, d, and e, were found to be without adverse effect on germination (table 2). Germination of the Semesan-treated seed was seriously impaired, and DuPont 1155HH stopped germination completely.

In another experiment Semesan and 8-hydroxyquinoline sulfate were compared on Duncan grapefruit seed at several levels of moisture content. The moisture content of the seed was varied by the following pre-treatments: (a) soaked in water 4 hrs. to establish maximum content of water, (b) air-dried 4 hrs., (c) air-dried 24 hours, and (d) air-dried 3 days. Lots of 60 seed each from the various treatments were then stored in cellophane bags for one month at a mean temperature of 70°F. Upon germinating the seed it was found that viability of seed in contact with Semesan became lower as the moisture content was increased (table 3). The viability of untreated seed was decreased somewhat at the lowest moisture level.

Effect of Moisture on Viability. The effects of the moisture factor was investigated more fully in the

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MINERALS International CHEMICALS

following experiment. Freshly extracted Duncan grapefruit seeds, treated with Fermate and untreated, were stored at nine levels of relative humidity at room temperature for 2, 4, and 8 weeks. The several humidity levels were maintained over different concentrations of sulfuric acid in desiccator jars. After storage for the period indicated the seeds were germinated in moist sawdust. At the lowest humidity levels germinability of the seed decreased rapidly with increased time of storage, although the decrease was less rapid in the treated lots (table 2). At the higher levels of humidity a high degree of viability was maintained for a much longer period, especially in conjunction with the use of Fermate.

At this point the authors were confronted with the necessity of storing seeds of a large number of citrus varieties that were required for rootstock investigations. Fruits of the desired varieties were collected from several sources, and the seeds were extracted and prepared immediately for storage. In a few instances the seed had been extracted by others and were received in a dry condition. After thoroughly washing and drying on paper towels, all seeds were treated by dipping in a 1.0% aqueous solution of 8-hydroxyquinoline sulfate and dried again on paper towels before being mixed with moist sawdust or moist ground-up moss (sphagnum-like moss). Excess moisture had been removed from the moss and sawdust immediately prior to mixing, by squeezing the wet material in the hand. Duplicate lots of each variety of seed mixed with moist sawdust (or moss) were placed in half-pint fruit jars fitted with glass covers that were held in place by a wire strap over the top. Rubber sealing rings were not used, and ventilation was provided for by placing a piece of cardboard under one edge of the glass cover so as to raise one side. The seeds were stored at 35°F. until required for planting six months later.

Upon opening the jars, nearly all lots of seed were found to be in as good condition as when they were placed in storage. However, several jars of seeds were found to be moldy, and their germination subsequently proved to be poor. In the course of preparing the seeds for storage it was discovered that in a few instances the same solution of 8-hydroxyquinoline sulfate had been used to treat seeds on more than one day. It is believed that the moldy lots of seeds were those treated with a spent solution, in view of the general excellence of the other lots in this test and in other tests not reported here. After separation from the sawdust and moss the stored seeds were planted in beds of white sand of 4-inch depth underlain with 4 inches of ground-up peat. Sixty-eight seeds of each variety (four rows across the bed) were planted, half from sawdust storage and half from moss storage. The remaining seeds were remixed with the sawdust or moss and returned to storage. No difference could be noted in germination of seed from the two storage media, although the sawdust seemed to have dried out less than the moss.

Germination was recorded on ap-

(Continued on page 20)

Table 5. Germination of citrus seeds after treatment with 1.0% 8-hydroxyquinoline sulfate and storage at 35°F. for 6 months

Variety of seed	No. of varieties	Germination percent
Pina tangelo, Tangor, Tavares limequat, Seminole tangelo, Lakeland limequat, Rough lemon	7	100
Orlando tangelo, Suwannee tangelo, Minneola tangelo, Duncan grapefruit, Webber tangelo	5	99
Watt tangelo, Cleopatra mandarin, Sweet lemon	3	97
Satsumelo, Hamlin orange, Clementine mandarin	3	96
Ponkan mandarin, Calamondin, Sour orange, Iran lemon, Kalpi lime, Dancy tangerine, Temple orange	7	94
King mandarin, Bergamia sour orange	2	93
Oklawaha sour orange, sweet sdlg. orange	2	91
Nagami kumquat	1	88
Bitter Sweet orange	1	77
Uvalde citrange	1	65
Leonardy grapefruit	1	68
Rusk citrange	1	55
Total	34	Ave. 92.6

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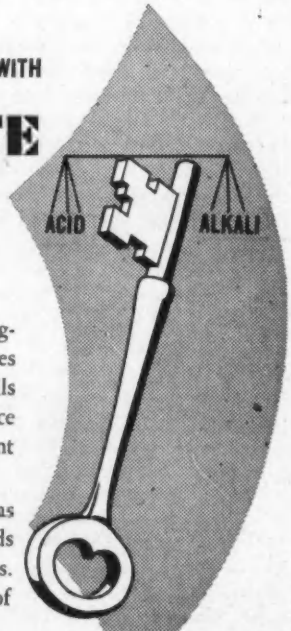

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PRESIDENT'S ADDRESS

(Continued from page 3)

water in the Everglades and Lower East Coast areas last year delayed planting of both vegetables and bulbs which resulted in very heavy production at certain times and a consequent drop in prices. The distribution of products was not as uniform as normal. Excessive water in the Lake Okeechobee and Lower East Coast sections again this year will delay plantings and may cause similar market conditions to last year. Prices drop quickly when "gluts" occur.

Vegetable plantings in the winter producing areas, extending roughly from Vero Beach to Homestead, increased by more than 20,000 acres during the last 10 years. This rate of increase of winter vegetables is not expected to continue.

The U. S. Department of Agriculture has developed and released a new variety of tomato named the Southland that is "field immune" to the Fusarium Wilt and the State Vegetable Crops Laboratory at Bradenton has developed 2 new varieties, the Manahill and the Manasota that are also immune. The Southland and the Manahill are both resistant to Early Blight and the Manahill is also resistant to the Gray Spot disease of the leaves. By next year it is hoped that seed houses will have fair stocks of all 3 of these varieties.

No new diseases of vegetables appeared during the year but "Black Heart" in celery was especially severe in the Sarasota area. The Bradenton laboratory has definitely proven that all leaf spot diseases can be kept under reasonable control by spraying with dithane-zinc sulfate-lime formul on a 5 day schedule.

The cut flower industry in South Florida has expanded very rapidly in the last 5 years. Last year approximately 1650 acres were planted on the Lower West Coast and about 1000 acres planted on the Lower East Coast. Market conditions were very good during the fall and early winter season but from January 15th to May 1st, the market was depressed.

The prices of gladiolus were down for the second consecutive year. Plantings of "glads" had expanded so rapidly during the war period that overproduction finally occurred and "gluts" developed. Some disease in shipments also hurt prices.

The Curvularia disease of gladiolus (new to Florida last year) caused losses on both corms and cut flower stock. A breeding program has been started at Bradenton to develop a disease resistant strain of the Picardy which is the principal variety of gladiolus.

The amount of Narcissus planted has gradually declined for several years until there are only 4 or 5 growers having any sizeable acreage.

Easter lily plantings increased at a tremendous rate during the war years but by 1946, the virus disease known as fleck had become so severe and widespread that it put many growers out of business. No satisfactory method of controlling this disease under Florida conditions has been developed to date. Buyers will not buy bulbs for forcing from fleck infected fields.

The growing of Amaryllis has developed into quite an industry in Florida and market prices have been reasonably good.

The Ornamental Section of the Society was formed last year and

(Continued on page 21)

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A METHOD OF MAINTAINING VIABILITY OF CITRUS SEED IN STORAGE

(Continued from page 18)

proximately half of the number of varieties planted, the other varieties having been removed from the beds for us in another experiment before the record was taken. Germination was recorded for each seed planted so that the presence of multiple seedlings resulting from polyembryony was not a complicating factor. Of the 34 varieties listed, 29 germinated better than 90 percent after six months' storage (table 5).

After 8 months' storage the remaining seeds from the same jars were planted. Records were kept of the germination of all varieties of which there was sufficient seed (68) to plant a full strip in the bed (table 6). Of the 33 varieties listed, 27 show better than 80% germination.

Conclusion

These results give evidence that at least four factors affect the maintenance of viability of citrus seed in storage: (1) microorganisims, (2) moisture, (3) temperature, and (4) aeration.

It has been shown in two instances that viability of citrus seed is greatly depressed by microorganisms (a) the poor germination of untreated seed as compared to Fermate-treated seed (table 4), and (b) the poor germination of seeds that became moldy in storage at 35°F. due to treatment with a spent solution of 8-hydroxyquinoline sulfate. It is believed that Barton's work on the viability of citrus seed under storage conditions is seriously weakened through inadequate recognition of the importance of this factor.

The moisture or humidity level at which seed is stored is of equal importance with the first factor. The above results indicate that the viability of citrus seed is best maintained by storage at humidity levels approaching saturation (table 4), though not necessaryily by the presence of free moisture.

Indirect evidence was obtained that low temperature promotes longevity of stored citrus seed, through its depressing effect on germination of seed in storage, on respiration of seed, and on the growth of fungi and bacteria, thus supplementing in some measure the action of fungicides.

The fact that dry storage conditions cause serious loss in viability of citrus seeds indicates that they are in a more active state of metabolism than many other seeds. Accordingly, access to sufficient oxygen must be essential to the prolonged storage of citrus seeds.

Summary

Of the ten compounds tested as surface-disinfecting agents on citrus seed, five ((a) Semesan, (b) 8-hydroxyquinoline sulfate, (c) Puratized N5E, (d) thiocyano aniline, and (e) DuPont 1155HH) were found efective in contrilling the growth of microorganisms. Three of these compounds, b, c, and d, were found to be without injurious effect on viability under moist conditions. Citrus seed was dipped in 1.0% solution of 8-hydroxyquino-

Table 6. Germination after 8 months' storage at 35°F., seeds treated with 8-hydroxyquinoline sulfate

Variety of seed	No. of varieties	Germination percent
Watt tangelo, Yaiaha tangelo, Orlando tangelo, Suwannee tangelo	4	99
Nippon kumquat, Sampson tangelo	2	97
Nakorn pummelo	1	96
Thong Dee pummelo, Clementine mandarin	2	94
Seminole tangelo, Duncan grapefruit, Pina tangelo, Williams tangelo, Satsumelo, Dancy tangerine	6	93
Natsu Kikan sour orange	1	91
Minneola tangelo	1	90
Ogami pummelo, Cleopatra mandarin, Calamondin, Iran lemon, Kalpi lime	5	88
Hamlin orange, Siamese pummelo, Tavares limequat	3	82
King mandarin, Tangor	2	81
Sweet lemon	1	78
Lakeland limequat	1	74
Leonardy grapefruit	1	66
Kansu	1	62
Sour orange No. 2	1	29
Bergamia sour orange	1	19
Total	33	Avg. 84.5

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Other citrus titles

The Citrus Industry, Volume I: *History, Botany, and Breeding,* edited by Webber and Batchelor. $10.00

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Tables of Surfaces and Volumes of Spheres and of Prolate and Oblate Spheroids, and Spheroidal Coefficients, by Franklin Marion Turrell. $2.00

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line sulfate and stored in moist sawdust or moss, in non-sealed containers at 35°F. for 6 to 8 months. Of 34 varieties of citrus for which records were available, 29 gave better than 90% germination at 6 months; and of the 33 varieties with records at 8 months, 27 gave better than 80%.

PRESIDENT'S ADDRESS

(Continued from page 19)

there was a reasonably good attendance at the meeting even though there was little advance publicity. We shall be very happy to see this new section grow and prosper.

The Krome Memorial Institute reports that interest in tropical and sub-tropical fruits, other than citrus, has increased steadily during the year. The acreage of avocados, guavas and mangos was substantially increased despite hurricanes and floods. New varieties of guava have been distributed to nurseries and individuals and a breeding project to improve the guava was started by the Sub-Tropical Experiment Station at Homestead. Air-layering, by using the technique employed on the lychee, described by Wm. R. Grove in the 1947 Proceedings, has proven a rapid and satisfactory method of propogating the common guava.

A method of grafting small seedling lychees was developed by the Florida Station which will permit rootstock studies with this excellent fruit which is becoming established as a new commercial fruit for Florida.

A variety collection of sapodillas has been established at the Sub-Tropical Experiment Station and includes selections of importations from Nassau, budded to seedling stock.

Budwood of avocados from Central America was obtained from Dr. Wilson Popenoe and successfully grafted to seedling stocks at the Sub-Tropical Experiment Station at Homestead.

There have been 177 new species of fruits and oranmentals imported during the year and these are being grown at the Sub-Tropical Station. New diseases of the avocado and papaya are being studied there.

Considered as a whole, the horticultural interests of the State have had a fairly successful year. Progress will be made in production methods, disease and insect pest control and it is hoped reasonable success will be attained in marketing. This is the greatest problem facing the citrus growers in Florida today.

INSURANCE AGAINST A FOREIGN INVADER

(Continued from page 15)

others to warn us against the serious danger almost at our door must depend entirely on the recognition and use by us of all available measures of protection. One of these measures would seem to be the suggested establishment of nursery grown seedlings of immune varieties immediately available for inarching if the strange disease should gain entrance to our shores. One would not need to wait until the disease actually invaded the grove or until immune seedling stocks could be grown. Better it would seem to be to start inarching at once as a measure of insurance against later disaster.

Co-ops have pioneered in bringing large scale electric power to rural areas. About 95 per cent of REA-financed electric systems have been built cooperatively by local groups.

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Growers' Own Page

FAVORS COUNTY ORGANIZATIONS

Editor The Citrus Industry,
Bartow, Florida,
Dear Sir:

Orlando, Fla., Nov. 19.

Why don't you give these County Growers' Organizations of truly bona fide citrus growers some deserved publicity and assistance? These county units are taking shape like wild fire, and it won't take us six months to achieve our purpose, i. e,—Setting a per tree price on all varieties and grades of fruit, for who has a better right to do so? Why not make the market HERE IN THE GROVE and not at auction where it does not belong—account of the "system" and certain very bad aspects of such outmoded, antiquated, crazy system of "selling?"

Bert Livingston is doing his utmost to put the Grower's idea over, and we want and need YOU and I know you also wish to help, which has been self-evident by your fine editorials for the past twenty-eight years.

Big things are breaking right now. We were up until 3 o'clock this morning and we meet with Attorney General Tom Watson today at 2 o'clock with Tampa Tribune press reporters on hand and all Orlando Sentinel staff reporters.

Our one best slogan—"UNITED WE EAT — DIVIDED WE STARVE."

And we are not going to starve —not as long as I can wiggle my stumps and chatter.

You can almost depend upon a jump in range prices within three to six weeks of from $1.00 to $1.25 per field box, on-tree prices. Now this is going some place with two weeks' work by a handful of determined growers, mad to the core. I don't intend to borrow money to to pay taxes to enrich shippers and canners, and everyone else feels likewise—when they understand how easy it is to get something done if you really want it accomplished.

These growers up here are not discouraged, but sore as hell at finding out how easy it was to bring about profitable prices when they could have done it 30 years ago by proper action.

Very truly,
D. J. NICHOLSON.

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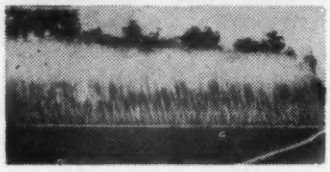

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CANNING AND BY-PRODUCTS RESEARCH AT CITRUS EXPERIMENT STATION

Continued from page 11)

period of approximately one to two hours. About one half of the tasters on the panel are from states other then Florida. Thus far it has been possible to have 20 to 30 persons score the juice samples each day. However, because of other duties, it is impossible for everyone on the panel to score all samples every day.

We are also attempting to develop a small panel of five or six persons who through training and practice may become skilled tasters of citrus products. Also, eventually consumer preference tests using larger groups of men, women, or children may be undertaken. Standards for citrus juice quality should be based upon consumer preference rather than upon the preference of research personnel, growers, or processors, and therefore, large scale consumer testing should be done in those parts of the country where most of the citrus juices are sold and consumed.

LITERATURE CITED

1. Plank, R. P. A rational method for grading food quality. Food Technology 2, 241-251, 1948.

A new home demonstration club was organized recently in the Jupiter community under the direction of Mrs. Mildred J. Michaud, assistant Palm Beach County home agent.

Classified Ads

CITRUS TREES for fall and spring delivery. All varieties. F. Gould Garcia, Box 843, Lakeland, Florida.

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